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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,276	09/14/2005	Aleksei Mikhailov	A9473	6666
20741 7590 09/20/2007 HOFFMAN WASSON & GITLER, P.C CRYSTAL CENTER 2, SUITE 522 2461 SOUTH CLARK STREET ARLINGTON, VA 22202-3843			EXAMINER ZHANG, YUANDA	
			ART UNIT 2828	PAPER NUMBER
			MAIL DATE 09/20/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/526,276	Applicant(s) MIKHAILOV ET AL.	
	Examiner Yuanda Zhang	Art Unit 2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2005.  
 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,5-10,12-25,27 and 28 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1,3,5-10,12,17-20,22-25,27 and 28 is/are rejected.  
 7) ☒ Claim(s) 13-16 and 21 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 14 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☒ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/01/05 and 08/20/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 03/01/05 and 08/20/07 is being considered by the examiner.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 5-10, 12, 25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaeli (US Patent 4,797,894) in view of Mooradian (US Patent 5,050,179).
5. In re claim 1, with reference to figure 1 A, Yaeli discloses a semiconductor laser device comprising: a semiconductor laser element with at least one exit surface (front and rear facet of the laser diode 10) from which laser light can emerge, which in a first direction (Y) has greater divergence than in a second direction which is perpendicular to it (inherent, the light tends to have a greater divergence when it's away from the center of the light emitting axis) (Col. 3 lines 50-58); at least one reflection means (concave spherical mirror 18) which is located spaced apart from the exit surface (rear facet 11)

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outside of the semiconductor laser element (Col. 3 line 63 – Col. 4 line 3), with a reflecting surface (concavely curved surface on mirror 18) which can reflect back at least parts of the light (full beam feedback, Col 5 lines 20-24) which has emerged from the semiconductor laser element through the exit surface into the semiconductor laser element such that a mode spectrum of the semiconductor laser element is influenced thereby (light is reflected back to the laser diode from the reflective surface of the spherical mirror 18 through the back facet of the laser diode and it's inherent that the mode is influenced by the reflected light because it interferes with the internal cavity of the laser diode) (Col. 4 lines 6-10); and the reflective surface of the reflection means is concavely curve (concave spherical mirror 18, Col. 3 lines 64-65).

6. Yaeli does not disclose a lens means which is located between the reflection means and the semiconductor laser element and which can at least partially reduce the divergence of the laser light at least in the first direction (Y).

7. However, Mooradian discloses a lens (14) located between the reflection means (mirror 20) and the semiconductor laser element (diode laser 10) and which can at least partially reduce the divergence of the laser light at least in the direction perpendicular to the light-emitting or optical axis (Col. 5 lines 9-12).

8. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the semiconductor laser device of Yaeli with a lens between the exit surface and the reflection mean as taught by Mooradian in order to reduce the divergence by collimating the laser light beam.

9. In re claim 3, Yaeli discloses the reflecting surface in the first direction (Y) and in the second direction, which is perpendicular to it, has a curvature of essentially the same size or curvatures of differing magnitude (inherent, the curvatures are either the same or different).

10. In re claim 5, Yaeli discloses an optical distance (D) between the reflecting surface and the exit surface of the semiconductor laser element is essentially equal to the focal length (F) of the reflecting surface with respect to at least one of the directions (Y) (the curvature or the focal length of the mirror 18 equals to the distance between the reflecting surface and the exit surface,  $L = R$ , Col. 4 lines 23-28).

11. In re claim 6, Yaeli / Mooradian have disclosed the semiconductor laser device above except the reflection means has a width of more than 200 microns.

12. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reflection means of Yaeli with a width of more than 200 microns in order to meet a certain design requirement, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 MPEP 2144.05 (II-A)

13. In re claim 7, Yaeli / Mooradian have disclosed the semiconductor laser device above except the exit surface has a width of more than 500 micron.

14. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the exit surface of Yaeli with a width of more than 500 microns in order to meet a certain design requirement, since it has been held that

where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 MPEP 2144.05 (II-A)

15. In re claim 8, Yaeli discloses the reflecting surface or at least one of the reflecting surfaces is made as a wavelength-sensitive element (inherent, output light is reflected back to the laser diode for creating a desired wavelength).

16. In re claim 9, Yaeli discloses the optical distance (D) and/or the curvature of the reflecting surface are chosen such that the beam waist on the exit surface of at least component beams of the light which has been reflected back to the semiconductor laser element corresponds essentially to an aperture which is formed by the exit surface (Col. 5 lines 20-29).

17. In re claim 10, Yaeli discloses the semiconductor laser element (laser diode 10) is a broad strip emitter or a bar or stack of broad strip emitters (array of stripes, Col. 3 lines 42-49).

18. In re claim 12, Yaeli discloses the exit surface of the semiconductor laser element facing the reflecting surface is coated with an antireflective coating (AR coating 16, Col. 3 lines 52-55).

19. In re claim 25, Yaeli / Mooradian have disclosed the semiconductor laser device except the lens means is made as a cylinder lens with a cylinder axis which extends essentially in the second direction which is perpendicular to the first direction.

20. It would have been an obvious matter of design choice to use a cylinder lens, since applicant has not disclosed that a cylinder lens solves any stated problem or is for

any particular purpose and it appears that the invention would perform equally well with a spherical lens 14 as disclosed by Mooradian.

21. In re claim 27, Yaeli discloses the semiconductor laser element is exposed to a voltage and is supplied with a current for producing electron-hole pairs only in partial areas, which correspond to a three-dimensional extension of the desired mode of the laser light (inherent, a laser diode is electrically pumped).

22. In re claim 28, Yaeli discloses the reflecting surface is spherically curved (concave spherical mirror 18, Col. 3 lines 64-65).

23. Claims 17-19 and 22-23 rejected under 35 U.S.C. 103(a) as being unpatentable over Yaeli (US Patent 4,797,894) and Mooradian (US Patent 5,050,179) as applied to claim 1 above, and further in view of Hiiri (US Patent 6,163,558).

24. In re claim 17, Yaeli / Mooradian have disclosed the semiconductor laser device above except between the semiconductor laser element and the at least one reflection means there is a deflection means which can deflect onto the at least one reflection means the component beams which are emerging at an angle ( $\alpha$ ) to the normal on the exit surface from the latter.

25. However, with reference to figure 1A, Hiiri discloses a prism 5 as deflection means which can deflect onto the at least one reflection means the component beams which are emerging at an angle ( $\alpha$ ) to the normal on the exit surface from the latter (the angle is formed by the leg and the hypotenuse, see figure 1A).

26. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the semiconductor laser device of Yaeli / Mooradian with a prism as taught by Hiiron in order to deflect the laser beams from the laser diode array in different polarizations.

27. In re claim 18, Hiiron discloses the deflection means and the at least one reflection means are located on an axis which is dictated by a middle perpendicular on the exit surface (the axis divides the prism in the middle, see figure 1D).

28. In re claim 19, same rejection as applied to claim 17 is maintained.

29. In re claim 20, Hiiron discloses the prism element is arranged such that the leg surfaces are facing the exit surface of the semiconductor element (see figure 1D).

30. In re claims 22 and 23, Yaeli discloses the reflecting surface of the at least one reflection means (reflective surface of mirror 18) is made highly reflecting (maximum full beam feedback, Col. 5 lines 20-24), the exit surface of the semiconductor laser element facing away from the reflecting surface (front facet 26 where the light is emitting out from the laser cavity) being made partially reflecting and in this way being able to be used as a decoupler (since the rear facet is coated with AR coating 16, the laser light will exit at the front facet which has to be partially reflecting).

31. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaeli (US Patent 4,797,894) and Mooradian (US Patent 5,050,179) as applied to claim 1 above, and further in view of Daiber et al (US Patent 6,804,278 B2).



32. In re claim 24, Yaeli / Mooradian have disclosed the semiconductor laser device above except between the semiconductor laser element and the at least one reflection means there is a wavelength-selective element which is an etalon.

33. However, Daiber et al disclose an etalon (34) as a reflection means in the optical path as a wavelength-selective element (see figure 1).

34. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the semiconductor laser device of Yaeli / Mooradian with an etalon as taught by Daiber et al in order to obtain a desired wavelength by filtering unwanted wavelengths.

#### ***Allowable Subject Matter***

35. Claims 13-16 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuanda Zhang whose telephone number is 571-270-1439. The examiner can normally be reached on Monday-Thursday, Alternating Fri 8:30am-6:00p EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YZ  
09/05/07

